UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 7,088,427 B2
APPLICATION NO. : 10/828579
DATED : August 8, 2006
INVENTOR(S) : Smith et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 1, line 61 to column 2, line 25, please amend as follows:

--The effect of the illumination source ~~(source)~~ when coupled to projection imaging objective (PIO, or lens that relay the reticle object plane to the wafer plane) aberrations has been documented, as has the deleterious effects of improperly or non-optimally configured sources themselves on lithographic printing. See, for example, "Differences of Pattern Displacement Error Under Different Illumination Conditions", N. Seong et al., *SPIE*, Vol. 3334, 868:872, 1998; "Effect of Off-Axis Illumination on Stepper Overlay", N. Farrar, *SPIE*, Vol. 2439, 273:275, 1995; "Overlay Error Due to Lens Coma and Asymmetric Illumination Dependence", H. Nomura et al., *SPIE*, Vol. 3332, 199:210, 1998; and see "The Effects of an Incorrect Condenser Lens Setup on Reduction Lens Printing Capabilities", D. Peters, *Interface 85*, Kodak Publ. No. G-154, 66:72, 1985; "Impact of Local Partial Coherence Variations on Exposure Tool Performance", Y. Borodovsky, *SPIE*, Vol. 2440, 750:770, 1995; "Condenser Aberrations in Kohler Illumination", D. Goodman et al., *SPIE*, Vol. 922, 108:134, 1988; "Mathematical Treatment of Condenser Aberrations and their Impact on Linewidth Control", C. Krautschik et al., *Intel*, 1:12, 1998; "Examples of illumination Source Effects on Imaging Performance", A.J. deRuyter et al., *ARCH Chemicals Microlithography Symposium*, 2003. Comprehensive modeling will generally require knowing the radiant intensity across the projection field, machine settings, and machines. See, for example, "Understanding Systematic and Random CD Variations using Predictive Modeling Techniques", D. Flagello et al., *SPIE*, Vol. 3679, 162:175, March 1999; "Understanding Across Chip Line Width Variation: The First Step Toward Optical Proximity Correction", I. Liebmann et al., *SPIE*, Vol. 3051, 124:136, 1997.--

Column 6, lines 4-9, please amend as follows:

--Another design point, referring to FIG. 1, with a chrome opening CO in a chrome coating on the reticle face RF, is large enough to allow the entire source as represented by the marginal imaging point MIP of FIG. 5 to pass. One of the main ~~reason~~ reasons for keeping some chrome coating is to reduce stray light reflection off of the reticle.--

Column 10, lines 50-67, please amend as follows:

--When recording the source images in photoresist on a wafer, the process flow of FIG. 19 is used. First an MFISIO as described herein is provided and loaded onto the machine we are characterizing. Next a resist coated substrate (wafer) is provided and loaded on the machine. Next, the substrate is exposed at multiple, increasing exposure

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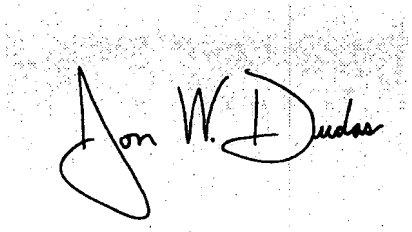
Column 10, lines 50-67, (cont'd)
doses at discretely separated image fields on a ~~wafer~~ wafer. See, for example, page 3 of "Examples of Illumination Source Effects on imaging Performance" by A.J. de Ruyter et. al. in 2003 ARCH Chemicals Microlithography Symposium, *supra*. The substrate is then developed and the exposed images are photographed one by one. From these images and knowledge of the exposure dose sequence, the "raw" intensity contours of $\frac{dE}{do}$ (nx,ny) are obtained. Next these intensity contours are computationally overlapped and the radiometric and the exit pupil transmission correction factor (Equation 4) are applied to reconstruct the normalized radiant intensity (FIG. 21):--

Signed and Sealed this

Twenty-seventh Day of March, 2007



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